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ABSTRACT

Results of administering a computerized adaptive version of the Grammar, Spelling, and Punctuation Test (GSP) to students in the College of Communication at the University of Texas, Austin were studied. The computerized adaptive version (CAT) was administered for the first time in June 1992 to 35 prospective students who participated in the College of Communication's Minorities in Communication (MICOM) program. MICOM is a minority student recruitment program for high-achieving minority students. Statistical comparisons of the two versions conducted in a previous study were used to indicate the relationship between the paper-and-pencil scores and CAT scores. One result of the test administration is the average total number of items administered on the computer version of the test was 60.5 items, as opposed to the 100 items required on the paper-and-pencil version. MICOM students taking the CAT version were asked for feedback about the test and their experiences with microcomputers. Students had favorable attitudes about the CAT test, and most indicated that they would prefer it to the paper-and-pencil version. Students also indicated a great deal of experience with computers. One table summarizes study findings. (SLD)

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The Grammar, Spelling, and Punctuation (GSP) test is a placement test administered to students in the College of Communication as a means of determining eligibility to register for certain courses in Journalism, Advertising, and Radio-TV-Film. The 100-question examination is offered at the beginning of each semester and prior to pre-registration periods during the fall and spring semesters. Students are administered one of six forms of the multiple-choice test in typical paper-and-pencil format.

In the field of psychometrics, an increasing amount of research is being conducted in the area of computerized adaptive testing (CAT). Computerized adaptive testing procedures involve the repeated estimation of an examinee's ability level based on his or her responses to items which have been presented and the adaptation of further item selection according to each item's degree of difficulty and the examinee's latest ability estimate. Advantages of computerized adaptive testing over paper-and-pencil versions include administration of only those items appropriate for an examinee's ability level, shorter test length (usually one-fourth to one-third shorter) with equal or greater precision of measurement, and immediate feedback provided to the examinee. The purpose of this study was to investigate the results of administering a computerized adaptive version of the GSP as well as to gain insight into examinees' attitudes towards this particular format of the test.

The computerized adaptive version of the GSP was administered for the first time by the staff of the Measurement and Evaluation Center on June 24, 1992, to prospective students who participated in the College of Communication's Minorities in Communication (MICOM) program.

Method

Subjects

The MICOM program in the College of Communication is a minority student recruitment effort for high-achieving minority students from Texas high schools. These students are brought to the University of Texas at Austin for five days of structured activities during the summer between their junior and senior years. One of the scheduled activities for the 1992 group was to take the computerized version of the GSP test. The MICOM group consisted of 35 minority students.

Materials

The item bank for the CAT version was developed from the pool of items contained in the six forms of the paper-and-pencil version. The items span a wide range of difficulty levels.

Examinees may take the sections in any order on the CAT version; however, they cannot move between sections. Each section must be completed before moving on to the next one. Within each section, items are selected and presented in a tailored fashion based upon each examinee's performance on previously administered items. Specifically, the first item administered to each examinee is randomly selected from those items which have a difficulty level in the middle range. If the examinee responds correctly to the first item, the next item presented will be more difficult than the first; however, if the examinee responds incorrectly, an easier item is presented next. This process of adapting the presentation of items to match the examinee's skill level based on responses to the previous items is continued until a sufficiently accurate estimate of the student's skill is obtained or a predetermined maximum number of items have been administered within a section. The result is that students are administered test items that are appropriate for their skill level; consequently, they are not administered items that are either too easy or too difficult for them. For this reason, students are not typically required to take as many test items with the computer adaptive version as they are with the paper-and-pencil version. For this study, the prespecified maximum number of items per section corresponded with the limits on the paper-and-pencil version: 33 items for the Grammar and Punctuation sections and 34 items for the Spelling section.

The computer adaptive and paper-and-pencil versions of the GSP test are reported on different scales. Scores on the paper-and-pencil version are reported on the traditional number correct scale, whereas scores on the computer adaptive version are reported on a 20 to 80 scale. A score of 72 is considered to be passing on the paper-and-pencil version. Statistical

comparisons of the two versions of the test conducted in a previous study indicate that a composite score of 45 on the computer adaptive version is equivalent to a score of 72 on the paper-and-pencil version. The composite score is the average of the Grammar, Spelling, and Punctuation scale scores on the CAT version.

Procedure

In 1991, a study was conducted to calibrate the items from the six paper-and-pencil forms of the GSP in order to develop a large item bank for a computerized adaptive version of the test, though not all items from the paper-and-pencil versions were included in the final CAT item bank.

On June 24, 1992, 35 students in the MICOM group in the College of Communication were administered the CAT version of the GSP. Examinees were presented with instructions via computer and allowed time to become familiar with the keyboard and the appropriate method of responding. As stated previously, examinees were able to select the order in which they took the three sections, but they were required to complete each section before moving on to the next one. Results were presented to the student through the computer immediately after completion of the three sections.

After the students completed the computer adaptive version of the GSP test, they were asked to provide feedback about the test and about their previous experiences with microcomputers by responding to a set of 11 questions. These questions were also presented via the computer.

Results of the Test Administration

The average time taken from the presentation of the first screen of instructions to completion of the last of the three sections of the GSP test was 39.4 minutes, whereas examinees are allowed up to 90 minutes to complete the paper-and-pencil version of the test. The average time taken for each of the three sections was 15.4 minutes for the Grammar section, 4.4 minutes for the Spelling section, and 14.5 minutes for the Punctuation section. These means, along with the corresponding standard deviations and minimum and maximum times, are presented in Table 1.

The paper-and-pencil version of the GSP contains 100 items (33 in the Grammar section, 34 in Spelling, and 33 in Punctuation), and examinees are required to take all items; however, examinees are not required to take 100 items on the computerized version. The test ends when

an accurate estimate of one's ability has been obtained or all items in a section have been administered. The average number of test items administered for each section was 19.6 items for the Grammar section, 21.7 for Spelling, and 19.2 for Punctuation. Overall, the average total number of items administered on the computer version was 60.5 items, as opposed to the 100 items required on the paper-and-pencil version. Table 1 presents the mean number of items administered per section as well as additional descriptive statistics.

The average scaled scores (20 to 80 scale) were 42.5 for Grammar, 50.5 for Spelling, and 45.3 for Punctuation. The average composite score was 46.1. Sixty percent of the students obtained a score of 45 or greater. These means and additional descriptive statistics are shown in Table 1.

Table 1

Descriptive Statistics for the Test Scores, Number of Items Administered, and Testing Times from the Computerized Version of the Grammar, Spelling, and Punctuation Test Given to the MICOM Group on June 24, 1992 (N=35)

Scale	Mean	SD	Minimum	Maximum
Composite	46.09	8.32	32.00	61.00
NIA	60.51	7.70	53.00	85.00
TT	34.30	7.04	18.70	51.72
Grammar	42.54	11.68	20.00	66.00
NIA	19.60	2.77	17.00	33.00
TT	15.41	4.52	7.45	30.22
Spelling	50.49	9.16	31.00	69.00
NIA	21.74	5.03	17.00	34.00
TT	4.42	1.54	1.77	9.17
Punctuation	45.26	10.43	20.00	60.00
NIA	19.17	2.06	17.00	26.00
TT	14.47	3.50	7.42	22.83

Note. NIA is the number of items administered and TT is actual testing time.

Student Feedback

After the students completed the computer adaptive GSP test, they were presented 11 questions concerning their attitudes about the computerized test and their previous experience with computers. These questions and the distribution of responses to each question are shown below.

The directions for the computerized version were clear.

Strongly Agree	54.3%
Agree	45.7%
Neutral	0.0%
Disagree	0.0%
Strongly Disagree	0.0%

The arrow keys used to enter my answers were easy to use.

Strongly Agree	68.6%
Agree	22.9%
Neutral	2.9%
Disagree	5.7%
Strongly Disagree	0.0%

I liked getting my scores immediately after the test was finished.

Strongly Agree	85.7%
Agree	11.4%
Neutral	2.9%
Disagree	0.0%
Strongly Disagree	0.0%

I think that the computerized version assessed my skills accurately.

Strongly Agree	37.1%
Agree	25.7%
Neutral	28.6%
Disagree	2.9%
Strongly Disagree	5.7%

Which version of the GSP would you prefer to take?

Computerized	68.6%
Paper-and-Pencil	22.9%
No preference	8.6%

Have you ever used a computer at school?

Yes	94.3%
No	5.7%

Have you ever used a personal computer outside of school?

Yes	80.0%
No	20.0%

Have you used a personal computer to play games?

Yes	94.3%
No	5.7%

Were any of your lessons in school presented on a computer?

Yes	62.9%
No	37.1%

Have you used a computer for word processing?

Yes	88.6%
No	11.4%

Were any of the tests you took in school given on a computer?

Yes	31.4%
No	68.6%

It is evident from the students' responses to these questions that their attitudes about the computer adaptive version of the GSP test were quite favorable. The majority of the students indicated that they would prefer to take the computerized version rather than the paper-and-pencil version. The students also indicated a great deal of previous experience with computers. It is interesting to note that the two questions with the fewest number of affirmative responses were the ones concerning the presentation of school lessons via computer and computerized testing (adaptive or not) in school.